Strategies to Improve Access to the General Education Curriculum

Education professionals increasingly focus on identifying programs, practices, and strategies that are *research based*. To be considered as the highest ("gold") standard of *research based*, educational practices must have evidence that is (a) supported by rigorous and scientific data (high quality) and (b) have a body of studies that demonstrate positive outcomes (high quantity). The No Child Left Behind (NCLB) Act passed in 2001 (www.nclb.gov) and many federal grant programs call on educators to use scientifically-based research to drive their decisions about educational interventions.

To be considered *scientifically based*, research should be objective, empirical, replicable, have valid and reliable data, use particular research designs, and use rigorous data analysis (See Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User-Friendly Guide. Available at: www.ed.gov/rschstat/research/pubs/rigorousevid/guide_pg3.html). In general, more research needs to be conducted that uses the "gold standard" of scientific rigor. In addition, more careful review of existing research needs to occur in order to evaluate and synthesize evidence relating to programs and practices. As an example, the U.S. Department of Education has funded the What Works Clearinghouse (www.w-w-c.org) to serve as an independent source of scientific evidence of what works in education. However, such careful and systematic reviews take an enormous amount of time and manpower.

In the meantime, a body of research does suggest that specific programs and practices are effective with particular students. Increasing exposure to such research-supported instructional methods and practices, materials and media, and supports and accommodations will help students with disabilities effectively engage in learning general education curriculum content.

The following chart lists strategies that have research support, but have not yet undergone the highest level of scientific review. Analysts at the Access Center have classified these strategies on a continuum depending on their research base: "green light" strategies (backed by significant research support) and "yellow light" strategies (should be used with caution – some research support, but need more validation).[1]

To assist state and local technical assistance providers and administrators in selecting research-supported practices, the professionals at the Access Center compiled information on strategies in the following areas: Instructional Methods and Practices, Supports and Accommodations, and Assessment. The chart below identifies twelve green light and yellow light practices. The following information is provided for each research-supported practice:

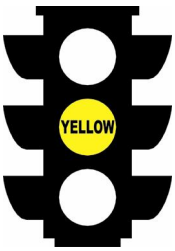
- *Student Characteristics Addressed:* specifies the types of challenges the strategy targets
- *Practice Description:* gives specific information regarding the use of the strategy
- *How It Improves Access:* explains how effective implementation can improve access to the general education curriculum for students with disabilities

[1] This green light and yellow light classification was developed by the CEC's Division of Learning Disabilities and the Division of Research.

- *Supporting Research*: identifies sources of findings on the practice
- *Implications for Practice*: outlines considerations for implementation, including costs
- *Sources of Additional Information:* lists additional websites and resources for more information about the practice

In addition, several of the research-supported practices include links to content-area "applications." These applications expand on the practice and provide an explanation of how it can be used within a particular content area.

The Access Center will continue to expand this list and provide additional information about these and other research-supported interventions on our website (www.k8accesscenter.org/) as they become available. Check back frequently for more resources and information about effective practices to improve access to the general education curriculum for students with disabilities.

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Instructional Methods and Practices					
Computer Assisted Instruction (CAI)  Application to - ▪ Math ▪ Reading ▪ Writing ▪ Science	Children with – Fine motor challenges Attention deficit Minimal organizational strategies Difficulty decoding and comprehending text Communication delays Weak problem-solving skills Difficulty with abstract concepts	Computer programs or high-tech equipment provide content instruction to students to enable them to meet standards and goals. Sample features– Independent instruction for student May measure student skill and progress Interactive Immediate feedback	Allows multiple means of interacting with curricular materials Allows teachers to individualize lessons to meet children's specific goals while helping them meet state and local standards	CAI may be an academic motivator for students with disabilities (Hitchcock & Noonan, 2000). CAI increases wait time and builds on mastered skills (Hitchcock & Noonan, 2000; Zimmerman, 1998). Effectiveness is attributed to the higher interaction required for responses and active learning (Lahm, 1996). Varying results of effectiveness from research (Kroesbergen & Van Luit, 2003)	Allows great flexibility in use because it is not subject specific Requires professional development for use in classrooms Requires purchase of technology and software if not currently available Requires that individuals with expertise be available for trouble shooting Requires time for teacher planning and instructing students to use software

Sources of Additional Information

Lahm, E. (1996). Software that engages young children with disabilities: A study of design features. *Focus on Autism and Other Developmental Disabilities, 11*(2), 115–125.

Hauser, J., & Malouf, D.B. (1996). A federal perspective on special education technology. *Journal of Learning Disabilities, 29*(5), 504–512.

Hitchcock C.H., & Noonan, M.J. (2000). Computer-assisted instruction of early academic skills. *Topics in Early Childhood Special Education, 20*(3), 145–159.

Hutinger, P.L. (1996). Computer applications in programs for young children with disabilities: Recurring themes. *Focus on Autism and Other Developmental Disabilities, 11*(2) 105–115.

Kroesbergen, E.H., & Van Luit, J.E.H. (2003). Mathematics interventions for children with special educational needs: A meta-analysis. *Remedial and Special Education, 24,* 97–115.

Office of U.S. Special Education Programs (2000). *Twenty-second annual report to Congress*, (Chapter 3, pp. 37–48). Washington, DC: U.S. Department of Education

Zimmerman, S.O. (1998). Problem-solving tasks on the microcomputer: A look at the performance of students with learning disabilities. *Journal of Learning Disabilities, 21*(10), 637–641.

Web Resources

The Access Center: Improving Outcomes for All Students K – 8. Available at http://www.k8accesscenter.org. Go to Resource, then Universal Design.

CAST. Available at http://www.cast.org/

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Concrete, Representations (Semiconcrete), and Abstract Sequence of Mathematics Instruction (CRA or CSA)  Application to - ▪ Math	Students who are in general education, at risk and/or in special education Students with difficulties in these areas– • using symbols and abstract mathematical concepts • processing information • sustaining attention to task • monitoring and self-regulating • performing basic math skills • reasoning and • using problem-solving skills	Three phases— • Concrete phase of mathematical concept uses hands-on manipulatives • Representations phase uses pictorial display • Abstract phase uses numerical symbols or algebraic letters of abstract mathematical concepts Repetition of different types of manipulatives or representations of same concept Graduated and conceptually supported framework for creating connection between C–R–A levels of understanding	Enables children to— • retrieve background knowledge and • become confident with an approach to reason Provides a path for more complex problem-solving situations Addresses student learning styles by providing visual, tactile, and kinesthetic experiences Allows group or individual instruction Allows students to move in a structured way from concrete to abstract concepts through pictorial representations such as charts, graphs, symbols, and diagrams Facilitates abstract reasoning with numerical symbols	Builds a foundation with structured concrete materials for developing concepts in number sense, geometry, statistics, story problems, and measurement (Bruni & Silverman, 1986; NCTM, 2000) Develops more precise and comprehensive mental representations (Harrison & Harrison, 1986, Suydam & Higgins, 1977) Allows students to understand numerical symbols and abstract equations at a concrete level (Devlin, 2000; Maccini & Gagnon, 2000) Facilitates learning place value (Peterson, Mercer, O'Shea, 1988) Facilitates development of computation skills (Mastropieri, Scruggs, & Shiah, 1991) Promotes acquisition and retention of arithmetic facts and mathematics concepts (Miller & Mercer, 1993)	May require purchase of commercial materials (e.g., number cubes, fraction bars, geometric figures) May require time to practice repetition of sequence to establish understanding of concept May require professional development for teachers to learn to model concrete and visual materials establishing links to abstract concepts

Sources of Additional Information

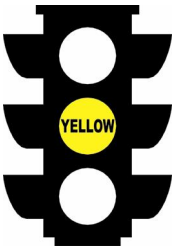
Devlin, K. (2000). Finding your inner mathematician. *The Chronicle of Higher Education, 46*, B5.

Maccini, P., & Gagnon, J. C. (2000). Best practices for teaching mathematics to secondary students with special needs. *Focus on Exceptional Children, 32,* 1–22.

Maccini, P., McNaughton, E., & Ruhl, K. L. (2000). Algebra instruction for students with learning disabilities: Implications from a research review. *Learning Disability Quarterly, 22,* 113–126.

Mastropieri, M. A., Scruggs, T. E., & Shiah, S. (1991). Mathematics instruction for learning disabled students: A review of research. *Learning Disabilities Research & Practice, 6,* 89–98.

National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: NCTM, Inc.

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Differentiated Instruction  Application to - ▪ Math ▪ Reading ▪ Writing ▪ Science	Differentiated instruction – ▪ addresses student readiness, which includes prior knowledge and skills ▪ addresses student interest ▪ addresses a student's learning profile, which includes learning style, environmental factors that affect the student's learning, and the student's grouping preferences	Teachers diagnose student readiness, interest, and learning profile. Instruction incorporates specific strategies that meet the needs of students and are based on the curriculum being presented. On-going assessment allows teachers to adjust instruction in response to student needs.	Enables students to access information using modalities that best meet their needs. Information is presented at students' individual readiness levels.	Qualitative and meta-analysis research indicate: ▪ That students in differentiated classrooms achieve better outcomes than students in classrooms without differentiation (Csikszentmihalyi, Rathunde, & Whalen, 1993; Tomlinson, Brighton, Hertberg, Callahan, Moon, Brimijoin, et al., 2003) ▪ When instructional materials are differentiated to meet student needs, interests, and readiness, academic gains increase (Kulik & Kulik, 1991; Lou, Abrami, Spence, Poulsen, Chambers, & d'Apollonia, 1996).	Requires time for planning and implementation. May require support from administration and co-teachers. May require a high level of student investment.

Sources of Additional Information

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). Talented teenagers: The roots of success and failure. New York: Cambridge University Press.

Kulik, J., & Kulik, C. (1991). Research on ability grouping: Historical and contemporary perspectives. Storrs, CT: University of Connecticut, National Research Center on the Gifted and Talented. (RIC Document Reproduction Service No. ED 350 777).

Lou, Y., Abrami, P., Spence, J., Poulsen, C., Chambers, B., & d'Apollonia, S, (1996). Within-class grouping: A meta-analysis. *Review of Educational Research, 66*, 423-458.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., et al. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature**.** Journal of the Education of the Gifted, 27, 119-145.

Web Resources

The Access Center. (2004). Enhancing Your Instructional Skills Through Differentiation. Washington, DC: The Access Center. Available at http://www.k8accesscenter.org/training_resources/Presentations.asp#differentiation

Hottlinx was developed by the University of Virginia. It provides strategies, lesson plans, unit plans, and assessments to support differentiated instruction. Available at http://www.hottlinx.org/

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Mnemonics  	Children with – Short- and long-term memory problems Difficulty with abstract problems Difficulty with decoding Lack of organizational skills	Mnemonics improves memory by linking new information to current knowledge through visual and verbal cues. Includes three methods– Keyword (linking new information to known words) Pegword (using rhyming word to represent number or order) Letter strategies (using acronyms and acrostics)	Gives students tools to encode information so they can retrieve it later Allows better understanding of subject-area content	Strategy is effective for increasing comprehension test scores (Mastropieri, Sweda, & Scruggs, 2000; Uberti, Scruggs, & Mastropieri, 2003). Gains have been shown on criterion-referenced tests and criterion-referenced measures (Swanson, 1999; Forness, Kavale, Blum, & Lloyd, 1997).	Requires minimal professional development for teachers and minimal additional resources beyond initially learning the mnemonic strategies Use can be across multiple content areas (language arts, mathematics, science, foreign language, etc.)

Sources of Additional Information

Forness, S.R., Kavale, K.A., Blum, I.M., & Lloyd, J.W. (1997). Mega-analysis of meta-analysis: What works in special education and related services. *Teaching Exceptional Children, 29*(6), 4–9.

Mastropieri, M.A., Sweda, J., & Scruggs, T.E. (2000). Teacher use of mnemonic strategy instruction. *Learning Disabilities Research and Practice, 15*, 69–74.

Swanson, H.L. (1999). *Interventions for students with learning disabilities: A meta-analysis of treatment outcomes.* New York: Guilford Press.

Uberti, H.Z., Scruggs, T.E., & Mastropieri, M.A. (2003). Keywords make the difference: Mnemonic instruction in inclusive classrooms. *Teaching Exceptional Children, 10*(3), 56–61.

Web Resources

The Access Center. (2003). Using mnemonics to facilitate access to the general education curriculum. Washington, DC: The Access Center. Available at http://www.k8accesscenter.org/training_resources/Mnemonics.asp

Current Practice Alerts: A focus on mnemonic instruction. Available at http://www.teachingld.org/ld_resources/alerts/5.htm

Tutorial on Mnemonics by Division of Learning Disabilities of CEC (Member's only section of website) Available at www.teachingld.org

Also see references for Learning Strategies section.

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Peer Assisted Learning Strategies (PALS)  	Children with – Difficulty decoding and comprehending text Communication delays Delays in mathematical concepts Difficulty with abstract concepts Noncompliant behaviors Aggressive behaviors Lack of attention Lack of organizational skills	Students interact through "coach/ player" pairings in structured cooperative-learning activities. Students support each other through frequent oral interaction, feedback, and reinforcement. Programs are available in reading for grades preschool–6 and mathematics for grades K–6.	Groups students with and without disabilities to assist with comprehension of general education content Promotes meaningful social interaction between peers with and without disabilities	PALS is approved by the U.S. Department of Education's Program Effectiveness Panel for Inclusion in the National Diffusion Network on effective educational practices (John F. Kennedy Center for Research on Human Development, 1999). Improves student test performance on a number of reading measures (Fuchs, Fuchs, Mathes, & Simmons, 1997; Fuchs, & Fuchs, 1998). PALS enables students to make connections with abstract mathematical concepts (Fuchs, Fuchs, & Karns, 2001; Fuchs et al., 1997).	Provides a complement to current reading and mathematics curricula Requires a set period of time for implementation: 25–35 mins/2 or3 times a week Requires professional development (workshop training and teacher manual)

Sources of Additional Information

Fuchs, D., & Fuchs, L.S. (1998). Researchers and teachers working closely together to adapt instruction for diverse learners. *Learning Disability Research and Practice, 13*(3), 126–137.

Fuchs, L.S., Fuchs, D., & Karns, K. (2001). Enhancing kindergartners' mathematical development: Effects of peer-assisted learning strategies. *Elementary School Journal, 101*(5), 495–510.

Fuchs, D., Fuchs, L.S., Mathes, P.G., & Simmons, D.C. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal, 34*(1), 174–206.

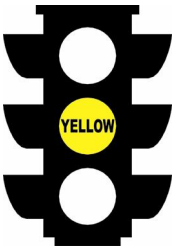
Mathes, P.G., Howard, J.K., Allen, S.H., & Fuchs, D. (1998). Peer-assisted learning strategies for first-grade readers: Responding to the needs of diverse learners. *Reading Research Quarterly, 33*(1), 62–94.

Web Resources

PALS (Vanderbilt University)
http://kc.vanderbilt.edu/kennedy/pals

Peer Assisted Learning Strategies in Reading
http://www.ldonline.org/ld_indepth/reading/peer_assisted.html

Fuchs, D., & Fuchs, L.S. (2002). *Learning accommodations for individuals with special needs.* Nashville, TN: Vanderbilt University, John F. Kennedy Center for Research on Human Development. Available at http://www.vanderbilt.edu/kennedy/programs/lai_main.html.

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Professional Collaboration  	Children with – Needs for related services provided by more than one specialist Needs for paraprofessional support Issues needing the expertise of more than one individual	Teachers and related service providers meet on a regular basis to problem solve, plan, and implement strategies to ensure that each student is able to participate in the general education curriculum. Collaboration partners vary depending on student need. Sample collaborators— • Regular and special educators • Regular, special, and speech educators, occupational therapists, physical therapists, nurses, and psychologists	Creates communication and support among multiple service providers Enhances and builds on the student's access to the general education curriculum Ensures that all providers integrate their services with one another	Collaboration streamlines instruction, prevents removal of students from general education classrooms, and ensures the integration of goals and standards to create success within the curriculum (Flemming & Monda-Amaya, 2001; Friend & Cook, 2000; Walter-Thomas et al., 2000). Academic growth for students with severe emotional disabilities is attributed to more teacher attention, reduced teacher-pupil ratios, and more individual assistance provided through collaboration (Carter, 2000).	Requires that teachers and related service providers communicate and send one message to parents and child Builds on partner strengths to ensure that lessons are accessible to students with disabilities Requires that time be built into the schedule for collaborative planning, implementation, and evaluation Requires that teachers be willing to share their space and welcome other professionals into their teaching Requires time and effort to build trust

Sources of Additional Information

Carter, B. (2000). The use of team teaching as a means to integrate students with special needs into the general education classrooms. Huntsville: University of Alabama, Curriculum Development/ED606.

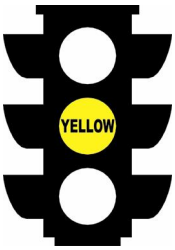
Coker, D.R. (1994). Collaboration in the classroom: Joint responsibilities of teachers for specified instruction. *Journal of Instructional Psychology, 21*(1) 3–7.

Flemming, J.L., & Monda-Amaya, L.E. (2001). Process variable critical for team effectiveness: A Delphi study of wraparound team members. *Remedial and Special Education, 22*(3), 158–171.

Friend, M., & Cook, L. (2000). *Interactions: Collaboration skills for school professionals* (3rd ed.). New York: Addison Wesley Longman.

Snell, M.E., & Janney, R. (2000). *Teacher's guide to inclusive practices: Collaborative teaching.* Baltimore: Paul H. Brookes.

Walther-Thomas, C., Korinek, L., McLaughlin, V.L., & Williams, B.T. (1999). *Collaboration for inclusive education: Developing successful programs*. Boston: Pearson Allyn & Bacon.

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Materials and Media					
Adapted Books/Texts  	Children with – Difficulty decoding and comprehending text Communication delays Lack of organizational skills Gross/fine motor deficiencies Cognitive delays Visual impairments Lack of attention	Texts and general education materials are modified. Low-technology materials (e.g., stickers, fabric, glue, highlighting) High-technology materials (e.g., talking switches, communication devices, talking books software, textbooks on tape)	Students spend a large amount of time interacting with text, much of which is develop-mentally inappropriate or inaccessible to different types of learners. Adapted texts and books are used in the general education curriculum to allow the participation of students with disabilities	Student differences significantly affect how they perceive and process information (Curry, 2003). Adapted texts allow more individuals to participate in the curriculum (Higgins, Boone, & Lovitt, 2002; Robinson, 2000).	Requires teachers and specialists to identify specific goals and add adaptations to books or create adapted books to accommodate and individualize for students in classrooms Requires time to create and collaborate on books Can be expensive depending on the quantity and level of technology involved Requires time to teach children how to use adapted books and may need one-on-one or small-group support while learning

Sources of Additional Information

Beck, J. (2002). Emerging literacy through assistive technology. *Teaching Exceptional Children, 35*(2), 44–48.

Curry, C. (2003). Universal design: Accessibility for all learners. *Educational Leadership,*

Higgins, K., Boone, R., & Lovitt, T.C. (2002). Adapting challenging textbooks to improve content area learning. In M.A. Shinn, H.M. Walker, & G. Stoner, (Eds.), *Interventions for academic and behavioral problems II: Preventive and remedial approaches,* (pp.755–790), Bethesda, MD: National Association of School Psychologists.

Lewis, S., & Tolla, J. (2003) Creating and using tactile experience books for young children with visual impairments. *Teaching Exceptional Children* 35(3), 22–28.

Technology specialists in your district

Web Resources

CAST. Available at http://www.cast.org/

Products for Special Needs & Education. Mayer Johnson, Inc. Available at http://www.mayerjohnson.com/

Robinson, L. (2000). *Adapting literacy activities for young children.* Macomb, IL: Center for Best Practices in Early Childhood. Available at www.wiu.edu/users/mimacp/wiu/articles/adaptlit.html

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Literacy Rich Environments  	Children with – Difficulty decoding and comprehending text Communication delays Lack of literacy-rich environment outside of school	Classroom environment ensures accessible literacy experiences through– Labels (pictorial and word) Large supplies of books Multiple writing opportunities (pencils/paper, computer, typewriter, etc.) Reading opportunities during school day Teachers engage in language and literacy activities throughout instruction. Students actively engage in reading and writing projects throughout the curriculum.	Provides students access to literacy by immersing them in an environment of print Provides students multiple opportunities for interaction with literacy (through words and books), which enables them to interact with the general education curriculum	Opportunities to engage in reading and writing activities increase literacy skills when connected to the real-world experiences of students with disabilities (Katims & Pierce, 1995). Opportunities to explore literature and intentional instruction facilitate development (Gunn, Simmons, & Kameenui, 1995; Snow, Burns, & Griffin, 1999; Whitehurst, 2003).	Requires that teachers have time to set up the environment, such as labeling everything with pictures and words Requires resources to purchase materials, such as books and magazines

Sources of Additional Information

Higgins, K., Boone, R., & Lovitt, T.C. (2002). Adapting challenging textbooks to improve content area learning. In M.A. Shinn, H.M. Walker, & G. Stoner, (Eds.), *Interventions for academic and behavioral problems II: Preventive and remedial Approaches,* (pp 755–790), Bethesda, MD: National Association of School Psychologists.

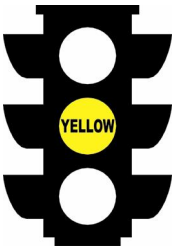
Katims, D., & Pierce, P. (1995). Literacy-rich environments and the transition of young children with special needs. *Topics in Early Childhood Special Education, 15*(2), 219–234.

Web Resources

Gunn, B.K., Simmons, D.C., & Kameenui, E.J. (1995). *Emergent literacy: A synthesis of the research.* Eugene, OR: National Center to Improve the Tools of Educators. Available at http://idea.uoregon.edu:16080/~ncite/documents/techrep/tech19.html

Snow, C.E., Burns, M.S., & Griffin, P. (1999) *Language and literacy environments in preschool.* Champaign, IL: ERIC Clearinghouse on Elementary and Early Childhood Education. Available at http://ericece.org/pubs/digests/ed426818.html

Whitehurst, G.J. (2003) *Classroom Literacy Environment Checklist*. New York: National Center for Learning Disabilities. Available at http://www.getreadytoread.org/pdfs/School_Environ_Scan.pdf

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Supports and Accommodations					
Grouping Strategies 	Children with – Communication delays Delays in mathematical concepts Difficulty decoding and comprehending text Weak problem-solving skills Difficulty with abstract concepts Lack of organizational skills Lack of attention	After assessing students' needs, teachers plan activities using various types of groups to ensure that students' needs and interests are targeted Example groupings include pairing, smaller teacher-led groups, and multiple grouping (vary the grouping from day to day) formats.	Enables teachers to use various types of groups to ensure that children have appropriate models and individual attention to facilitate access Teaches children appropriate social skills Fosters student independence and collaboration skills Allows individualization by teacher	Flexible grouping allows teachers to meet the needs of specific children while targeting interests (NCREL) Groups provide opportunities for improved social and academic interaction (Johnson & Johnson, 2000; Vaughn et al., 2001) In comparison studies, students in alternative groupings (compared with traditional whole class grouping) for reading demonstrated higher success rates for students with disabilities (Elbaum et al., 2000)	Requires sophisticated classroom management skills Requires time to plan and evaluate with other team members (who may be working with groups or individuals)

Sources of Additional Information

Johnson, D.W., & Johnson, F.P. (2000). *Joining together: Group theory and group skills* (7th ed.). Boston: Allyn & Bacon.

Shinn, M.R., Walker, H.M., & Stoner, G. (Eds.). (2000). *Interventions for academic and behavior problems II: Preventive and remedial approaches.* Bethesda, MD: National Association of School Psychologists.

Web Resources

Davenport, L.R. (1993). *The effects of homogeneous groupings in mathematics.* Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education. (ERIC Document Reproduction Service No. ED359065). Available at www.ed.gov/databases/ERIC_Digests/ed359065.html

Elbaum, B., Moody, S.W., Vaughn, S., Schumm, J.S., & Hughes, M. (2002). *The effect of instructional grouping format on the reading outcomes of students with disabilities: A meta-analytic review.* New York: National Center for Learning Disabilities. Available at http://www.ncld.org/research/osep_reading.cfm

Johnson, D.T. (2000). *Teaching mathematics to gifted students in a mixed-ability classroom.* Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education (ERIC Document Reproduction Service No. ED441302). Available at www.ed.gov/databases/ERIC_Digests/ed441302.html

North Central Regional Educational Laboratory (NCREL). Available at http://www.ncrel.org/

Vaughn, S., Hughes, M.T., Moody, S.W., & Elbaum, B. (2001). Instructional grouping for reading for students with LD: Implications for practice. *Intervention in School and Clinic, 36*(3), 131–137. Available at www.ldonline.org/ld_indepth/reading/instructional_grouping.html

Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Learning Strategies  Application to - ▪ Math	Children with – Difficulty decoding and comprehending text Communication delays Lack of organizational skills Weak problem-solving skills Difficulty with abstract concepts Delays in mathematical concepts Short- and long-term memory problems	Techniques, principles, or rules help students acquire, store, use, and retrieve information in various settings. According to NICHY (1997a), learning strategies generally fall into two categories– – Cognitive (i.e., task-specific, such as taking notes, making an outline, and asking questions – Metacognitive (i.e., self-regulation, such as goal-setting, self-monitoring, and self-questioning)	Enables students to learn and remember key concepts, thus enabling students to actively engage in curriculum content Helps students learn how to learn and allows them to become independent learners Increases students' confidence in their academic abilities	Students show improved independence in completing tasks, including improved reading comprehension (Alley & Deshler, 1979). Students better understand individual learning process (NICHY, 1997a) Students give more attention to learning (NICHY, 1997a)	Requires professional development (e.g., different learning strategies, their benefits and uses) Requires teachers to plan time to teach these learning strategies Several models for teaching learning strategies are discussed in the literature (e.g., SIM, self-regulated learners, and cognitive instruction)

Additional Sources of Information

Alley, G.R., & Deshler, D.D. (1979). *Teaching the learning disabled adolescent: Strategies and methods.* Denver, CO: Love.

Graham, S., Harris, K.R., & Reid, R. (1992). Developing self-regulated learners. *Focus on Exceptional Children, 24,* 1-16.

Reid, D.K., Hresko, W.P., & Swanson, H.L. (1996). *Cognitive approaches to learning disabilities* (3rd ed.). Austin, TX: Pro-Ed.

Web Resources

Boudah, D.J., & O'Neill, K.J. (1999). Learning strategies. Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Services No. ED433669) Available at http://searcheric.org/digests/ed433669.html

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Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Assessment					
Curriculum-Based Measurement (CBM)  	Children with – Communication delays Delays in mathematical concepts Difficulty decoding and comprehending text Weak problem-solving skills Difficulty with abstract concepts Lack of organizational skills Lack of attention	CBM is a valid and reliable form of curriculum-based assessment. CBM monitors academic progress in basic skills with short (1–3 minute) probes of reading, spelling mathematics, and writing fluency. The student's progress is measured against self and class. CBM allows for data-based decision making through a multiple-step process involving testing, analysis, and planning.	Assesses students' progress toward year-end academic goal Monitors students on an ongoing basis, provides information about students' strengths and areas for improvement Allows teachers to recognize learning difficulties and make immediate instructional changes that meet students' needs	Students with disabilities demonstrated increased academic growth rates in reading with use of CBM assessments (Deno, Fuchs, Marston, & Shinn, 2001). Students worked more quickly and accurately and became more active learners (Phillips, Fuchs, & Fuchs, 1994).	Allows teachers to easily track progress over time Allows teachers to evaluate effects of interventions Requires minimal time for teachers to learn CBM method Requires time to develop assessment probes and measures Computerized versions available

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Research-Supported Practice	Student Characteristics Addressed	Practice Description	How It Improves Access	Supporting Research	Implications for Practice
Functional Behavioral Assessment Systems 	Children with – Noncompliant behaviors Aggressive behaviors Communication delays Weak problem-solving skills Lack of attention	Teachers and specialists select a target behavior then record the antecedent (incidents immediately before the targeted behavior), the behavior, and the consequence that occurs when the targeted behavior is demonstrated. Information collected from observations is used to create a positive behavioral support plan and environment.	Allows teachers to examine the environment and its effect on students, adapt their teaching behaviors and the environment to meet student needs Provides students with greater opportunities to participate in the general education curriculum	The OSEP 22nd annual report to Congress recommended its use as a means to individualizing to meet specific students' needs (OSEP, 2000; Miller, Tansy, & Hughes, 1998; Miller, 2001). Functional Behavior Assessments (FBAs) are effective in reducing problem behaviors because they are aligned with the IEP process in monitoring the accomplishment of student goals (Shippen, Simpson, & Crites, 2003).	Requires time to watch and analyze behaviors Requires consistency in implementing functional behavior analysis (all observers must be active participants)

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Additional Resources

Access Center Resources

- The Access Center's FAQs on Research to Practice (http://www.k8accesscenter.org/training_resources/researchtopracticefaq.asp)

- The Access Center's website provides links to resources that focus on issues of access and research to practice. (http://www.k8accesscenter.org/training_resources/links.asp)

Other Federal Resources

- The **What Works Clearinghouse** (WWC) (http://w-w-c.org/faqs/index.html) was established by the U.S. Department of Education's Institute of Education Sciences to provide educators, policymakers, and the public with a central, independent, and trusted source of scientific evidence of what works in education. The Web-based databases will contain "an educational approaches and policies registry for evidence-based research reviews, a test instruments registry, and an evaluator registry that will identify individuals and organizations that are willing to conduct quality evaluation of education interventions (NCREL Viewpoints, 11, p.16).

- **Institute of Education Sciences** (http://www.ed.gov/about/offices/list/ies/index.html?src=mr) reflects the intent of the President and Congress to advance the field of education research, making it more rigorous in support of evidence-based education. The Institute consists of the National Center for Education Research, the National Center for Education Statistics, and the National Center for Education Evaluation and Regional Assistance.

- The **Regional Education Labs** (http://www.ed.gov/about/offices/list/ies/ncee/labs.html) Program (the Lab Program) is the U.S. Department of Education's largest research and development investment designed to help educators, policymakers, and communities improve schools and help all students attain their full potential. Administered by the Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, the network of 10 Regional Laboratories works to ensure that those involved in educational improvement at the local, state, and regional levels have access to the best available research and knowledge from practice.

- The **National Institute for Literacy** is directed to "provide national leadership regarding literacy, coordinate literacy services and policy, and serve as a national resource for adult education and literacy programs. The NCLB law directs the Institute to disseminate information on scientifically based reading research pertaining to children, youth, and adults as well as information about development and implementation of classroom reading programs based on the research." (http://www.nifl.gov/)